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OF THE
CHICAGO ACADEMY OF SCIENCE.

A PAPER ON
Elephas Primigenius.

BY W. K. HIGLEY, PH.D.

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ELEPHAS PRIMIGENIUS.

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(READ AT OCTOBER MEETING, 1886.)

During the past summer the Academy Museum has been enriched by a mounted specimen of that enormous animal of past ages, the mammoth, *Elephas primigenius*.

For this addition to our collection we are indebted to our President, Dr. Edmund Andrews, who with much labor kept the skeleton in view for many years, till the price was reduced to a reasonable sum, when he interested the following gentlemen in the matter, who, with himself, purchased the bones and presented them to the Academy: Hon. Wm. Bross, Philip D. Armour, John Crerar, Norman Williams, Joseph Frank, Wirt Dexter, Hamilton B. Bogue and the members of the Mastodon Club. Thus, by the kindness of these gentlemen the Academy comes into possession of the only bones, I believe, ever found in this country in a sufficient state of preservation or numbers to permit of mounting.

Inspection proved that these remains were not only worthy of our attention in the unmounted state, but also that they were in such a condition that they could, by restoring certain parts, be placed in their natural position. It was deemed wise to mount them, for in this condition they would be much more instructive. This was attempted and for the grand result of the effort, which stands in the museum, the second mounted mammoth in the world, the Academy is indebted to Dr. J. W. Velie, assisted by Messrs. J. L. Hancock, Kuh, C. S. Babcock and Dr. Wyllys Andrews. These gentlemen volunteered their services and worked arduously and skillfully for the greater part of two months.

The bones were found in the spring of 1878, in the southwest part of Spokane County, Wash., on the farm of a Mr. Copelin. The country is a rolling prairie, about 2,100 feet above the sea, extending from the Rocky Mountains to the Cascade Range. The water-courses are timbered, the rest treeless. The soil is a rich black loam with white clay subsoil. Hang-

man's Creek, about 350 feet wide, runs through this part of the county into the Spokane River, which is a tributary of the Columbia. The prairie is an excellent grain land, and in the wild state produces grass thirty inches high.

The remains of four mammoths were found on the upland in a marshy hollow, about fifty feet in diameter, formed by a spring oozing out of the black mud, whose waters flowed off in a narrow valley to Hangman's Creek, about three-fourths of a mile distant. The bones were exposed while ditching in order to drain the spot.

A very perfect skeleton of a smaller animal, supposed, by a gentleman who saw it, to be a horse, was exposed with the mammoth bones. It is worthy of note that in this spring-hole cattle and other animals were occasionally mired.

Neither of the four skeletons found was complete, and in mounting, it was not always possible to tell one individual from another. Besides the four adult skeletons, there was a fragment of a small pelvis, probably from a foetus of one of the female mammoths dying pregnant.

The following is a list of bones found:

- 3 lower jaws, with teeth perfect.
- 13 cervical vertebræ.
- 20 dorsal vertebræ.
- 4 lumbar vertebræ.
- 9 caudal vertebræ.
- 1 sacrum.
- 2 pelves, one entire, and one supposed foetal fragment.
- 3 scapulas.
- 2 femurs, one a fragment.
- 1 patella.
- 1 ulna, a fragment.
- 2 humeri, one a fragment, and the other from another locality.
- 6 tusks.
- 7 upper molars and fragments.
- 32 ribs.
- 1 skull, merely some small fragments.
- 14 bones of the feet.

Thus the total number of bones, or their fragments, found was 121.

The total weight of the bones was about 700 pounds.

It will be noticed that the most important bones needed in making the measurements necessary for supplying the lost parts, in the process of restoration, were present. The work of restoration was done with conscientious care, using, when necessary, the bones of one of the smaller animals as patterns in modeling for the larger. In a few cases the bones of the *Elephas Indicus*, which are almost identical in form, served as patterns.

The height as it stands is 13 feet, while that of the St. Petersburg mammoth is only 9 feet 3 inches.

It will be of interest to compare the height of a few elephantine forms.

Jumbo's skeleton, *Elephas Africanus*, is 10 feet 3 inches; Warren's *Mastodon giganteus*, at Boston, is 11 feet, and the Hauser *Elephas Indicus* at Northwestern University, Evanston, Ill., is 10 feet 8 inches.

If we allow two inches for the gristly cushion under the feet, and three inches for the thickness of the flesh on its back, and some few inches for the wool and bristly mane, which is said to have crested the spine in the St. Petersburg specimen, it would seem that this animal, when living, must have been about 14 feet in height.

Some elephantine bones of great size have been reported from our western territories and attributed to *Elephas imperator*. If there is any adequate proof of such a species, our enormous specimen doubtless belongs to it, but the great size is not sufficient to prove a separate species when three smaller individuals were found in the same small area. Besides, the tusks have the peculiar and strong curve characteristic of the *Elephas primigenius*, and not known in any other elephant. The tusks were 9 feet 10 inches long measured on the outer curvature.

The teeth also correspond with those of the mammoth.

The following are some measurements of true bones in the mounted skeleton:

Length of tusk, 9 feet 10 inches.

Circumference of tusk at the base, 21 inches.

Number of laminæ of lower teeth, 19.

Breadth of lower teeth, $3\frac{1}{2}$ inches.

Length of lower teeth, 10 inches.

Breadth of lower jaw at the condyles, 23 inches.

Length of lower jaw, 22 inches.

Breadth of atlas, 18 inches.

Height of atlas, $9\frac{1}{2}$ inches.

Height of pelvis, 34 inches.

Breadth of pelvis, 62 inches.

Height of scapula, 39 inches.

Breadth of scapula, 25 inches.

Length of humerus, 45 inches.

Circumference of humerus at middle of shaft, 19 inches.

Dana says: "This ancient elephant was over twice the weight of the largest modern species, and nearly a third larger. The body was covered with a reddish wool and long black hair. One of the tusks measured $12\frac{1}{2}$ feet in length; it was curved nearly into a circle, though a little obliquely.

* * * At the mouth of the Lena one of these animals was found, at the beginning of this century, frozen and encased in ice. It measured 16 feet

4 inches in length to the extremity of the tail, exclusive of the tusks, and 9 feet 4 inches in height. It retained the wool on its hide, and was so perfectly preserved that the flesh was eaten by the dogs." [Manual of Geology, p. 565.]

So far as I am able to find, the species in Europe does not, on the average, exceed the stature of the living elephants, but this may be an error, or it may be that the climate and soil of our Western mountains and plains favored a larger stature in the species than in Siberia and Europe.

Perhaps at this point it would not be out of place to mention the "Lenape Stone," which has been made the subject of an exhaustive study by Mr. H. C. Mercer. This stone was found in Bucks County, Penn., in 1872. It has given rise to considerable discussion concerning its authenticity. A drawing on the stone represents the Indians in battle with the "hairy mammoth." Mr. Mercer holds that this is evidence indicating that the mammoth was contemporaneous with the American Indians. He believes in its authenticity, and has collected considerable evidence supporting his opinions, giving them to the public in a monograph published by G. P. Putman's Sons.

The spring-hole, in which the mammoth remains were found, was about 6 or 8 miles from a range of the Rocky Mountain system which separates the prairie country from Lake Coeur d'Alene. These mountains are heavily timbered everywhere. The habits of all the wild animals there is to keep to the mountains in the summer, but to retire to the prairie at the approach of winter, and the following spring to follow the receding snow up the mountain side again. Probably the mammoth did likewise. Prof. Baird says mammalian animals in general are taller and larger in proportion as their habitat is well north or in mountainous regions. This, with good food, may have resulted in an enormous growth. It may be that the grass on the fertile prairie, growing very luxuriantly, may have served as a food.

The mammoth, and in fact all elephantine remains, are usually found in groups composed of two or more individuals. At least four animals were entombed in one spot at the locality where the Academy specimen was found. Our former Director, Robert Kennicott, reported that in Alaska the bones of this species sometimes lie in clusters of several individuals. The Indians informed him of a valley where immense numbers of elephantine bones lay due, as they supposed, to a great battle among supernatural beings.

Dr. Stimpson exhumed, at Fort Wayne, Ind., three mastodons from one spot. In the island of Malta the extinct elephants are said to be huddled together in the upper valleys. It is thought by some that they were driven up by a submergence, and perished in groups in consequence.

The natives around the elephant lands of Hindostan think that the animals are in the habit of resorting to certain spots, deep in the forest, when they feel the approach of death, and thus leave their bones in groups.

If vast numbers exist in elevated valleys we might naturally admit the theory of their being driven together by the submergence which enclosed the Siberian specimen in frozen mud; but when only three or four are found together, we believe that the following theory is more plausible.

Animals, like men, when taken with fatal diseases, often suffer with thirst long after they have lost all desire for food and in fact have become too weak to travel after it. They might, therefore, be expected to loiter in and around their drinking places and to die there, one at a time, but ultimately accumulating in numbers.

Prof. Marsh, of Yale, informed Dr. Andrews that he had an unmounted Siberian mammoth in the museum store-room. So far as we know, that one and ours are the only nearly complete skeletons in this country, and ours the only mounted one.

